APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/080,728	02/22/2002	Brian C. Banister	LSI-006-CIP	8379

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EXAMINER
BURD, KEVIN MICHAEL

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 11/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/080,728	BANISTER, BRIAN C.
	Examiner	Art Unit	
	Kevin M. Burd	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>07 September 2006</u>.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-48</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☒ Claim(s) <u>8-13</u> is/are allowed.

6) ☒ Claim(s) <u>1-7,14,15,25-33,36-43 and 45-48</u> is/are rejected.

7) ☐ Claim(s) <u>16-24,34,35 and 44</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____.

        3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

1.   This action, in response to the amendment and remarks filed 9/7/2006, is a final

office action.

Response to Arguments

2.   Applicant's arguments with respect to claims 1-7, 14, 15, 25-33, 36-43 and 45

have been considered but are moot in view of the new grounds of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by
another filed in the United States before the invention by the applicant for patent or (2) a patent
granted on an application for patent by another filed in the United States before the invention by the
applicant for patent, except that an international application filed under the treaty defined in section
351(a) shall have the effects for purposes of this subsection of an application filed in the United States
only if the international application designated the United States and was published under Article 21(2)
of such treaty in the English language.

3.   Claims 46-48 are rejected under 35 U.S.C. 102(e) as being anticipated by Win et

al (US 6,804,312).

Regarding claims 46-48, Win discloses an apparatus and method of transmit

antenna weight tracking in a communication system (figure 5). The transmitter includes

a plurality of antenna. Weights are selected and they modify the previously determined

weights for the transmit antenna (column 8, lines 35-50). New transmitter weights are

determined based on a comparison between received signals (column 8, lines 43-50).

The transmitter can weight each desired signal from the selected subset of antennas by

manipulating the amplitude and phase of each desired signal such that the combined

weight signals as received by the receiver has an improved SINR as compared to

signals transmitted by other combinations of antennas or differently weighted signals

transmitted by a particular subset of antennas (column 8, lines 43-50). The receiver

provides feedback to the transmitter via a feedback path (column 8, lines 38-43).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1-6, 25-32 and 37-42 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Win et al (US 6,804,312) in view of Harrison et al (US 6,434,366).

Regarding claim 1, 31, 37 and 41, Win discloses the apparatus and method

stated above in paragraph 3. Win does not disclose determining a channel auto-

correlation matrix estimate of the forward channel gain vector and determining the

transmitter antenna weight vector based on feedback from the receiver and the channel

auto-correlation matrix estimate. Harrison discloses an apparatus and a method of

estimating adaptive array weights used to transmit a signal to a receiver in a wireless

communication system. The transceiver is shown in figure 5. A channel autocorrelation

matrix is determined (column 4, lines 38-67). When a single weight is used per element,

the set of weights may also be referred to as a "weight vector" (column 4, lines 12-14).

Feedback from the receiver is input to the weight computer 306 in figure 5 and these

weights are used to deliver the maximum power according to the correct autocorrelation

matrix (column 4, lines 38-67). Harrison discloses the output of the channel estimator

204 is a group of vectors that describe the impulse response of channels between each

base transceiver antenna element and subscriber antenna 201 (column 6, lines 41-46).

The vector is input to the weight estimator 602 that generates the weight vector (figure

6). The weight estimator comprises a sample channel autocorrelation matrix computer

270 (figure 210). It would have been obvious for one of ordinary skill in the art at the

time of the invention to combine the teaching of Harrison into the apparatus and method

of Win. This allows for the estimation of adaptive array weights used to transmit a signal

to a receiver in a wireless communication system, wherein the transmitter does not use

high-power, per-user pilots or high-capacity, complex signaling between the base

transceiver and the subscriber unit (column 2, lines 35-41).

Regarding claims 2, 4-6, 32 and 42, Harrison further discloses the matrix A is

generated according to the auto correlation matrix as stated in column 4, lines 38-67.

The transmitted signal will be received at the receiver (subscriber unit). The subscriber

unit will transmit transmitter control data to adapt the weights in the transmitter (column

4, lines 9-37). Harrison discloses the output of the channel estimator 204 is a group of

vectors that describe the impulse response of channels between each base transceiver

antenna element and subscriber antenna 201 (column 6, lines 41-46). The vector is

input to the weight estimator 602 that generates the weight vector (figure 6). The weight

estimator comprises a sample channel autocorrelation matrix computer 270 (figure
210).

Regarding claim 3, Harrison discloses the communication system is a CDMA
system (column 3, lines 39-42).

Regarding claims 25-30, Harrison further discloses the transmitter control data
provides the base transceiver information necessary to modify the traffic channel
signals in a way that enhances the gain of the antenna array for the particular location
of the subscriber units (column 4, lines 1-5).

Regarding claims 38-40, the transmitting antennas are connected as shown in
figure 5.

5.   Claims 7, 14, 15, 33, 36, 43 and 45 are rejected under 35 U.S.C. 103(a) as being
unpatentable over Win et al (US 6,804,312) in view of Harrison et al (US 6,434,366)
further in view of Oler et al (US 6,031,866).

Regarding claims 7, 33, and 43, the combination of Win and Harrison discloses
an apparatus and a method as stated above in paragraph 4. The combination does not
disclose calculating a reverse channel autocorrelation matrix in the disclosed base
station transceiver. Oler discloses the duplex base station in figure 1. The base station
comprises channel estimators for estimating the forward and reverse links and
according to this system, it is preferred that the reverse link and forward link training
sequences have a diagonal autocorrelation matrix (column 8, lines 25-30). It would have
been obvious for one of ordinary skill in the art at the time of the invention to incorporate

the teachings of Oler into the method and apparatus of the combination of Win and

Harrison. Oler discloses an asymmetric system will typically employ pre-equalization in

the forward link and post-equalization in the reverse link (column 3, lines 8-13) and it is

advantageous to reduce the computational complexity required for equalization at the

portable transceiver by determining the equalization parameters for the portable with a

computationally efficient channel estimation algorithm that exploits the advantageous

autocorrelation properties of specific training sequences (column 3, lines 17-25).

Regarding claims 14 and 15, the combination of Win and Harrison discloses an

apparatus and a method as stated above in paragraph 4. The combination does not

disclose calculating a reverse channel autocorrelation matrix in the disclosed base

station transceiver. Oler discloses the duplex base station in figure 1. The base station

comprises channel estimators for estimating the forward and reverse links and

according to this system, it is preferred that the reverse link and forward link training

sequences have a diagonal autocorrelation matrix (column 8, lines 25-30). It would have

been obvious for one of ordinary skill in the art at the time of the invention to incorporate

the teachings of Oler into the method and apparatus of the combination of Win and

Harrison. Oler discloses an asymmetric system will typically employ pre-equalization in

the forward link and post-equalization in the reverse link (column 3, lines 8-13) and it is

advantageous to reduce the computational complexity required for equalization at the

portable transceiver by determining the equalization parameters for the portable with a

computationally efficient channel estimation algorithm that exploits the advantageous

autocorrelation properties of specific training sequences (column 3, lines 17-25).

Regarding claims 36 and 45, Harrison further discloses the apparatus capable of calculating the autocorrelation matrix using eigenvectors and eigenvalues (column 7, line 66 to column 8, line 5).

Allowable Subject Matter

6.   Claims 8-13 are allowed.

7.   Claims 16-24, 34, 35 and 44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of
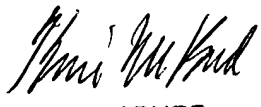
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Burd whose telephone number is (571) 272-3008. The examiner can normally be reached on Monday - Friday 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin M. Burd
11/21/2006

KEVIN BURD
PRIMARY EXAMINER